

A taxonomic revision of the *Eucalyptus striaticalyx* group (*Eucalyptus* series *Rufispermae*: Myrtaceae)

Dean Nicolle

156 Pimpala Road, Morphett Vale, South Australia 5162

Abstract

D. Nicolle. A taxonomic revision of the *Eucalyptus striaticalyx* group (*Eucalyptus* series *Rufispermae*: Myrtaceae). Nuytsia 11 (3): 365-382 (1997). A taxonomic revision of *Eucalyptus striaticalyx* W. Fitzg. *sens. lat.* has been undertaken based on morphological characteristics observed through field studies, herbarium research and seedling trials. *E. striaticalyx* W. Fitzg. subsp. *striaticalyx*, from the northern goldfields and *E. clelandii* F. Muell. from the central goldfields of Western Australia are treated and new taxa are described here as *E. striaticalyx* subsp. *delicata* Nicolle & P.J. Lang, restricted to a couple of lunette systems in the northern goldfields of Western Australia, *E. gypsophila* Nicolle, widespread in the Great Victoria Desert of Western Australia and South Australia, with remnant populations extending to the Gascoyne Region of Western Australia, *E. repullulans* Nicolle from the Pilbara area of Western Australia, and *E. canescens* Nicolle (with subsp. *canescens* and subsp. *beadellii* Nicolle), apparently endemic to the southern Great Victoria Desert of South Australia. Keys, maps and representative illustrations for all the described species are provided.

Introduction

Eucalyptus series *Rufispermae* Maiden (Myrtaceae) is one of the largest series in the eucalypts, with many undescribed and poorly known taxa, particularly in Western Australia, where the series is best represented in terms of species numbers and diversity. One of the most complex species in the series has been *Eucalyptus striaticalyx sens. lat.*, which has a widespread distribution in remote parts of southern Australia and exhibits great morphological variation across its distribution. Three new species and two new subspecies are here described based on field studies, herbarium research and seedling trials. Field studies have proved most useful in revising the *E. striaticalyx* group as features such as habit, bark type, leaf colour etc. are rarely mentioned on herbarium sheets. I have undertaken seven separate field trips through the Great Victoria Desert in the last four years, where plants attributed to *E. striaticalyx* are widely represented. Through ongoing seedling trials of all the closely related *Eucalyptus* species it has been found that seedlings within series *Rufispermae* as a whole are similar and generally not useful for distinguishing between taxa, unlike those of many other series within the eucalypts. *E. ser. Rufispermae* is equivalent to Pryor & Johnson's (1971) informal *E. ser. Dumosae* within *E. section Dumaria*.

Eucalyptus striaticalyx was described by Fitzgerald (1904) from specimens he collected in 1903 at Millys Soak, near Cue in the northern goldfields of Western Australia. *E. striaticalyx* is dominant around Millys Soak where it forms a rough-barked tree much larger than any other plants for many kilometres around.

The only other taxon of those treated here that has been previously described is *E. clelandii*. Maiden described *Eucalyptus goniantha* var. *clelandii* in 1911 from specimens he collected at Goongarrie, also in the northern goldfields and one year later Maiden raised it to specific rank, and appeared to dissociate it from the unrelated *E. goniantha* Turcz. Around Goongarrie, *E. clelandii* grows as a single-stemmed tree with a blackbutt and small pruinose buds and fruits.

Lang (1983), in his Ph.D. Thesis on the series *Rufispermae*, recognized much of the variation within *E. striatocalyx* and *E. clelandii* but suggested they be sunk under *E. dumosa* A. Cunn. ex Oxley (i.e. *E. dumosa* subsp. *dumosa* and subsp. *clelandii* respectively). This suggestion was never taken up by eucalypt taxonomists. However, potential new taxa were recognized by Lang and are treated here as *E. canescens* (Lang's PCVH) and *E. gypsophila* in part (Lang's PMAR and PSL). Since Lang's work, no other work has been done on the taxonomy of *E. striatocalyx*.

Eucalyptusstriatocalyx group

The *E. striatocalyx* group is geographically distinct from other taxa of series *Rufispermae*, occurring in drier, more inland areas than the rest of the series and includes the only species in the series known to occur in the tropics (*E. repullulans*). It extends from the Pilbara area of Western Australia south-east to near Ceduna in South Australia. Distribution maps for all the taxa are given in Figures 1 and 2.

The taxa treated here together form a somewhat arbitrary group of closely related taxa within the *Rufispermae*. They can be loosely defined within the series by the combination of inland arid habitat, small tree or mallee habit, dull to slightly glossy adult leaves, 7- 15- flowered inflorescences, peduncles to 23 mm long, pedicels 2-8 mm long, buds with a lightly to heavily ribbed operculum and cupular to cylindrical, smooth to ribbed fruits with a prominent operculum scar and descending disc.

Key to the species

- 1. Bark smooth throughout. Hamersley Ranges only 4. ***E. repullulans***
- 1. Bark rough, at least on lower stem(s). Gascoyne area of Western Australia to near Ceduna in South Australia, absent from the Hamersley Ranges 2
- 2. Tree. Operculum conical to beaked
 - 3. Erect tree with rough bark for 0.5-2 m only. Buds and fruits pruinose 1. ***E. clelandii***
 - 3. Erect to depauperate tree with rough bark to branches. Buds and fruits not pruinose 2. ***E. striatocalyx***
- 2. Mallee. Operculum hemispherical to conical 4
 - 4. Fruit 6-10 mm long. Adult leaves mostly broad-lanceolate to ovate, 18-25 mm wide 3. ***E. gypsophila***
 - 4. Fruit 10-16 mm long. Adult leaves lanceolate to broad-lanceolate, 22-55 mm wide 5. ***E. canescens***

1. *Eucalyptus clelandii* (Maiden) Maiden, Crit. Revis. *Eucalyptus* 2: 189 (1912).- *E. goniantha* Turcz. var. *clelandii* Maiden, Proc. W. Austral. Nat. Hist. Soc. 3: 176 (1911). *Type*: Goongarrie, Western Australia, September 1909, J.H. Maiden (*lecto*: NSW, *fide* J.H. Maiden, Crit. Revis. *Eucalyptus* 2: 190 (1912); *isolecto*: K, L, PERTH01377140).

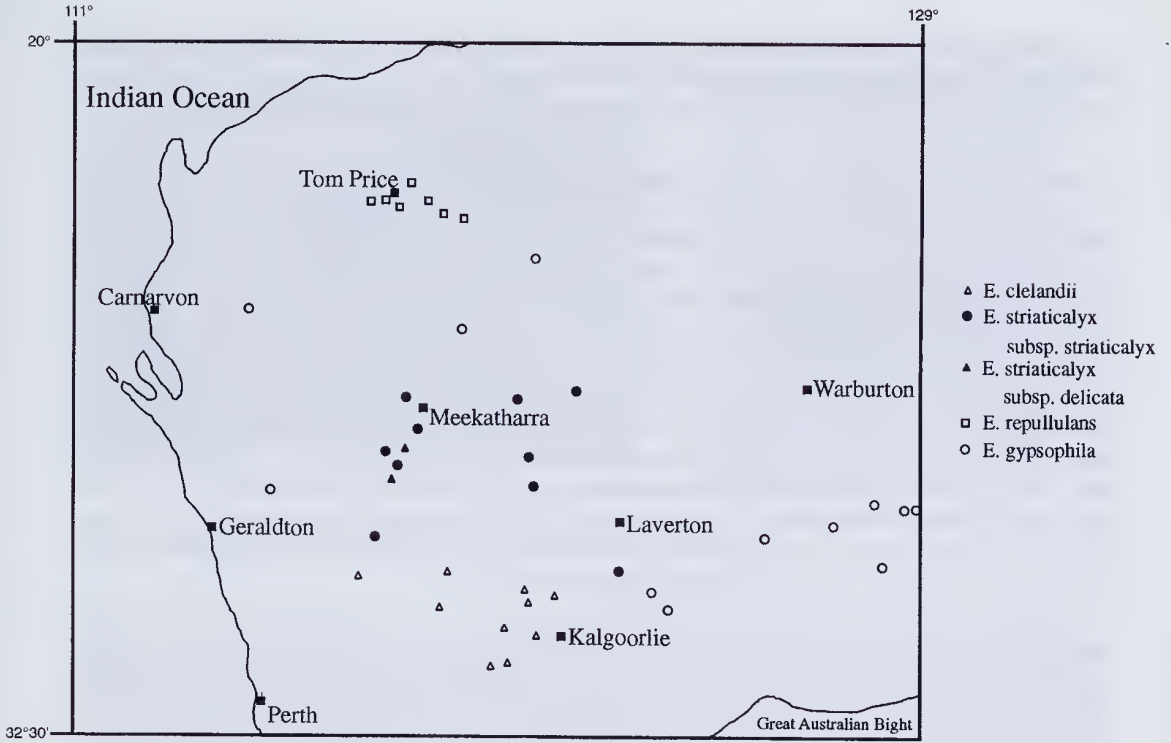


Figure 1. Distribution of the *Eucalyptus striaticalyx* group in Western Australia.

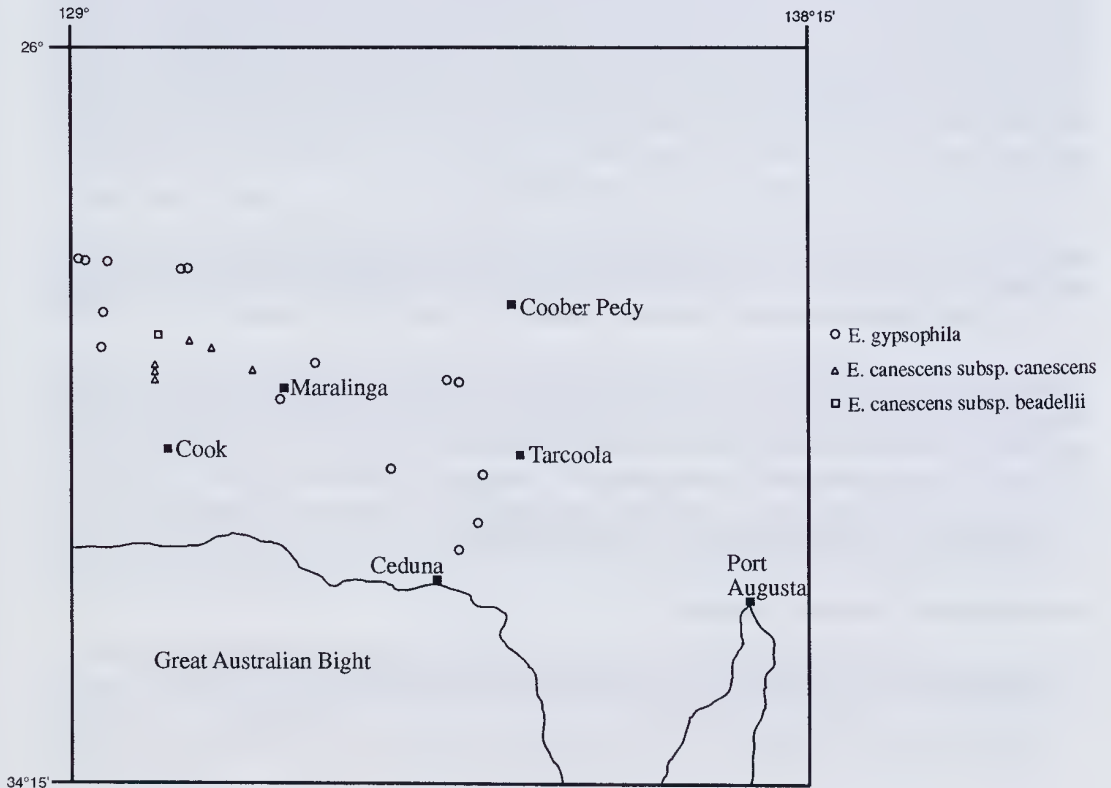


Figure 2. Distribution of the *Eucalyptus striaticalyx* group in South Australia.

Distinguished within the *E. striaticalyx* group by the combination of erect tree habit, persistent rough basal bark (blackbutt) then smooth above, pruinose twigs, buds and fruits, narrow-lanceolate to lanceolate leaves, small buds with a ribbed, beaked operculum and small slightly ribbed fruits.

Small, erect-stemmed *tree* 6-12 m tall; lignotubers not recorded. Rough *bark* persistent at base to 0.5-2 m, rough, thick, sub-fibrous, dark grey to almost black, then smooth, tan or pink-grey over cream to light grey thereafter, decorticating in ribbons. *Branchlets* pruinose; pith glands present. *Cotyledons* reniform; seedling leaves opposite for 3-6 pairs, petiolate, ovate, pruinose. *Adult leaves* alternate, petiolate, narrow-lanceolate to lanceolate, 60-150 mm long, 10-25 mm wide, concolorous, dull, blue-green to grey-green; reticulation dense with many irregular, intersectional oil glands; lateral veins at 35°-55° from midrib. *Inflorescences* axillary, unbranched, 7-11-flowered; peduncle terete, 6-20 mm long; pedicels 2-5 mm long. *Buds* 8-11 mm long, 4-6 mm diam., pruinose; hypanthium cupular, smooth to ribbed; operculum equal to or wider than hypanthium, ribbed, beaked, apiculate. *Stamens* strongly inflexed, all fertile; anthers versatile, oblong, opening by longitudinal slits. *Flowers* creamy white. *Ovules* in 4 vertical rows. *Fruits* pruinose, cupular to slightly campanulate, smooth to slightly ribbed, 4-8 mm long, 5-7 mm diam.; operculum scar ascending, 1-2 mm wide; disc level to descending, 2-3 mm wide; valves (3)4, at rim level to exerted. *Seeds* compressed ovoid, 1.2-2 mm long, glossy, dark red-brown, reticulum shallow to moderate; chaff glossy brown to dark red-brown. (Figure 3)

Selected specimens examined (west to east). WESTERN AUSTRALIA: 6.3 km E of Die Hardy Range road on Diemals - Menzies road, 29° 44' S, 119° 40' E, 16 Oct. 1984, *I. Brooker* 8696 (AD, CANB, PERTH); 64 km SW of Paynes Find, 29° 28' S, 117° 12' E, 18 Oct. 1984, *I. Brooker* 8716 (AD, CANB, PERTH); 14.5 km by road NE of road to Mt Gibson Homestead on Highway 95, 9 July 1978, *P.J. Lang* 1486, 1487 (AD); 1.3 km by road W of Bulla Bulling on Southern Cross-Coolgardie road, 11 July 1978, *P.J. Lang* 1514 (AD); 4.9 km by road NW of Coolgardie on Great Eastern Highway, 12 July 1978, *P.J. Lang* 1519, 1520 (AD); Rise immediately N of Arrow Lake (26.3 km by road N of Kalgoorlie on road to Menzies), 12 July 1978, *P.J. Lang* 1529 (AD); 5.9 km by road N of Goongarrie on road to Menzies, 12 July 1978, *P.J. Lang* 1530 (AD); 3.7 km by road S of Goongarrie on Kalgoorlie to Menzies road, E side, 13 July 1978, *P.J. Lang* 1543 (AD); N of Coolgardie, 30° 12' 23" S, 120° 37' 54" E, 15 Dec. 1992, *D. Nicolle* 333 (AD); Near Mt Gibson Homestead, 29° 31' 57" S, 117° 09' 52" E, 19 Sep. 1995, *D. Nicolle* 1559 (AD, CANB, PERTH); S of Diemals, 29° 46' 25" S, 119° 18' 17" E, 20 Sep. 1995, *D. Nicolle* 1565 (AD).

Intergrades. E. clelandii - E. striaticalyx subsp. *striaticalyx*: WESTERN AUSTRALIA: 2 km N of Mount Magnet Township on road to Meekatharra, creekside, Mount Magnet Golf Course, 8 Dec. 1978, *P.J. Lang* 1476 (AD); SW of Youanmi, 28° 36' 15" S, 118° 47' 40" E, 19 Sep. 1995, *D. Nicolle* 1553 (AD, CANB).

Distribution and habitat. Endemic to the goldfields of Western Australia from Mount Gibson Homestead north-east of Wubin, east to Menzies and Kalgoorlie. *E. clelandii* occurs on plains and low stony rises, sometimes in pure stands. The soils are red-brown loams, often over greenstone or on rises of lateritic ironstone. Associated species include *E. campaspe*, *E. celastroides* subsp. *celastroides*, *E. loxophleba* subsp. *supralaevis*, *E. ravida*, *E. salmonophloia*, *E. salubris* and *E. yilgarnensis*, with a sparse understorey, often dominated by chenopods. (Figure 1)

Flowering period. August to February.

Conservation status. Widespread and locally common and not considered to be at any risk.

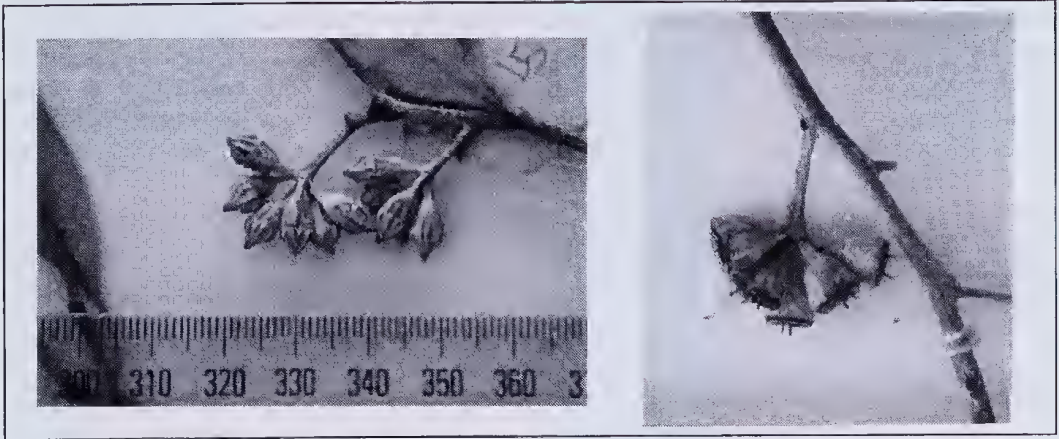


Figure 3. *Eucalyptus clelandii* buds and fruits (life size, from D. Nicolle 1559).

Notes. The western populations of *E. clelandii*, around Mount Gibson Station were once thought to be an outlier from the more eastern populations (Brooker & Kleinig 1990), however, more recent collections from east, south and west of Diemals Homestead show its distribution to be more continuous, with the Mount Gibson populations forming the westerly extremity of its distribution. In the south-west of its distribution, *E. clelandii* is replaced by *E. sheathiana* Maiden, differing in its variable tree or mallee habit, absence of basal rough bark and less ribbed, conical to hemispherical operculum. In the south-east *E. clelandii* is replaced by *E. polita* Brooker & Hopper, differing in the absence of rough basal bark, smaller leaves and smaller, generally non-pruinose and less ribbed buds and fruits. Intermediate forms (probably intergrades) between *E. clelandii* and *E. polita* or *E. sheathiana* are very uncommon but not unknown, where their distributions adjoin. (These intergrades can be recognized by their intermediate stem, leaf, bud and fruit morphology, and usually do not develop the characteristic blackbutt seen in *E. clelandii*.)

North of the distribution of *E. clelandii*, intergrades between *E. clelandii* and *E. striatocalyx* subsp. *striatocalyx* occur and can be distinguished from *E. clelandii* by their more crooked stature, finer textured, lighter coloured rough bark occurring further up the trunk and the slightly pruinose twigs, buds and fruits.

In the south-east of its distribution, *E. clelandii* may morphologically approach *E. lesouefii* Maiden, but the two species are usually well defined and easily separated, *E. lesouefii* having glossy, green adult leaves (dull, blue-green in *E. clelandii*) and larger, more prominently ribbed buds and fruits than *E. clelandii*.

2. *Eucalyptus striatocalyx* W. Fitzg., J.W. Austral. Nat. Hist. Soc. 1: 20-21 (1904). Type: Millys Soak, Western Australia, September 1903, *W. V. Fitzgerald* (lecto: PERTH 01394584, here designated; *isolecto*: E, NSW, PERTH01394592).

Distinguished within the *E. striatocalyx* group by the combination of habitat along drainage lines or salt lakes, tree habit, persistent rough bark over lower half to all of trunk, non-pruinose twigs, leaves, buds and fruits, dull to slightly glossy, blue-green to grey-green lanceolate to narrow-lanceolate leaves, slightly ribbed, small to medium-sized buds with a beaked operculum and small to medium, smooth fruits.

Tree, 5-12 m tall; lignotubers not recorded. Rough *bark* persistent, sub fibrous and flaky, grey-brown to dark grey over trunk and larger branches, then smooth and cream. *Branchlets* not pruinose or rarely becoming slightly pruinose on drying, pith glands present. *Cotyledons* reniform; seedling leaves opposite for 1-3 pairs then alternate, petiolate, ovate to broad-lanceolate. *Adult leaves* alternate, petiolate, narrow-lanceolate to broad-lanceolate, 70-160 mm long, 7-25 mm diam., concolorous, dull to slightly glossy, slightly blue-green to grey-green, never pruinose; reticulation dense, with numerous intersectional oil glands, lateral veins at 40°-50° from midrib. *Inflorescences* axillary, unbranched, 7-13-flowered; peduncle thick, slightly flattened, 8-23 mm long; pedicels 2-5 mm long. *Buds* not pruinose, 6-12 mm long, 3-7 mm diam.; hypanthium cupular, tapering to pedicel, smooth to shallowly ribbed; operculum conical to beaked, apiculate, equal in width or slightly wider than hypanthium, ribbed. *Stamens* strongly inflexed, all fertile; anthers versatile, oblong, opening by longitudinal slits. *Flowers* creamy white. *Ovules* in 4 vertical rows. *Fruits* non-pruinose, cupular to shortly cylindrical, 5-10 mm long, 5-9 mm diam., smooth to shallowly ribbed; operculum scar conspicuous, ascending, 1-2 mm wide; disc descending, 1-3 mm wide; valves (3)4, at rim level to slightly exerted. *Seeds* compressed-ovoid, 1.5-2.5 mm long, glossy, dark red-brown, reticulum fine to medium; chaff glossy orange to red-brown.

Notes. *E. striatocalyx* is typically a single-stemmed tree, however, many populations have in the past been periodically cut for the pastoral and mining activities in the area. This is most evident at the type location, where the population, upon first appearance, may appear to be a mixture of trees and large multi-stemmed tree-mallees (plants of tree proportion and thick stem diameter but with more than one stem arising from ground level as in a typical mallee). On closer inspection, the tree-mallee individuals have evidence of being cut approximately 0.5-1 metre above ground level, not just once, but in most cases two or three times. Only trees with curved or somewhat wavy stems have been left, presumably the poorer trees unsuitable for timber. *E. striatocalyx* is the dominant tree wherever it occurs and is substantially taller than any other surrounding vegetation for many kilometres. Therefore it seems that the original habit of this taxon has been altered due to lopping for posts and rails in fencing and props and beams in mining. Plants of a younger cohort at the type locality (less than about 20 years old) all show the tree form, most trees with straight stems with few side branches. This induced tree-mallee form is seen at its best at Millys Soak. At least some plants at many sites for this taxon have been cut earlier this century. This induced tree-mallee habit is not seen in *E. clelandii* to any great extent, possibly because it occurs in a more wooded habitat where other species such as *E. salmonophloia* and *E. melanoxyton* would be the preferred timber species.

E. striatocalyx differs from *E. gypsophila*, to which it is most closely related, in its larger, tree habit, its more extensive persistent bark, its consistently non-pruinose buds and fruits and its more pointed operculum.

Rare intergrading populations with *E. clelandii* to the south of its distribution and with *E. gypsophila* to the east of its distribution are known.

The common names Kopi Mallee and Cue York Gum have been applied to this species. The name Cue York Gum, in the strict sense, refers only to *E. striatocalyx*. The name refers to the type locality near Cue and its tree habit like that of the unrelated York Gum, *E. loxophleba*. The common name Kopi Mallee, which contradicts Cue York Gum in terms of habit would be more correctly applied to *E. gypsophila*.

There are two subspecies.

1. Crown not noticeably pendulous, leaves lanceolate to broad-lanceolate, mostly 12-25 mm wide 2a. subsp. **striatocalyx**
1. Crown noticeably pendulous, leaves narrow-lanceolate, mostly 7-14 mm wide 2b. subsp. **delicata**

2a. *Eucalyptus striatocalyx* W. Fitzg. subsp. *striatocalyx*

Distinguished from subsp. *delicata* by its more robust form; its more extensive rough bark; its lanceolate to broad-lanceolate adult leaves, 70-160 mm long by 12-25 mm wide; its larger buds and fruits (buds 8-12 mm long and 4-7 mm diam.; fruits 7-10 mm long and 7-9 mm diam.); and the crown, which is not notably pendulous. (Figure 4)

Selected specimens examined (north to south). WESTERN AUSTRALIA: 42 km W of Meekatharra on Beleleroad, 26° 26' S, 118° 04' E, 29 Aug. 1984, *I. Brooker* 8643 (AD, CANB, PERTH); 67 km from Paynes Find on Yalgoo Road, 28° 57' S, 117° 11' E, 24 Nov. 1986, *K. Hill* 2584 & *L.A.S. Johnson* (CANB, PERTH, MELB, NSW, CBG); Millys Soak, 15 km due N of Cue, 9 July 1978, *P.J. Lang* 1481, 1482, 1483, 1484, 1485 (AD); Lake Miranda, N of Leinster, 27° 41' 22" S, 120° 32' 41" E, 5 Oct. 1993, *D. Nicolle* 546 (AD); Between Leonora and Leinster, 28° 17' 31" S, 121° 08' 02" E, 17 Sep. 1995, *D. Nicolle* 1544 (AD); WNW of Meekatharra, 26° 28' 14" S, 118° 06' 19" E, 18 Sep. 1995, *D. Nicolle* 1545 (AD, CANB); Millys Soak, N of Cue, 27° 17' 10" S, 117° 55' 44" E, 18 Sep. 1995, *D. Nicolle* 1548 (AD, CANB, PERTH).

Intergrades. *E. striatocalyx* subsp. *striatocalyx* - *E. clelandii* intergrades are cited under the latter. *E. striatocalyx* subsp. *striatocalyx* - *E. gypsophila*: WESTERN AUSTRALIA: 22.1 km E of junction S side of Lake Minigwal, 25 June 1987, *I. Brooker* 9673 (CANB, PERTH); 3 km E of Mt Cleaver, 26° 32' S, 120° 31' E, 5 May 1978, *L.A. Craven* 5397 (CANB, PERTH); NE of Laverton, 28° 25' 10" S, 123° 15' 18" E, 17 Sep. 1995, *D. Nicolle* 1543 (AD, CANB).

Distribution and habitat. Endemic to the northern goldfields of Western Australia, from north-west of Meekatharra south-west towards Mongers Lake and north-east to Lake Carnegie with a more outlying population around Lake Minigwal in the south-east of its distribution where it grades into *E. gypsophila*. Although the total distribution is fairly wide, subsp. *striatocalyx* occurs in very scattered populations. Individual populations may be large, especially where it occurs around salt lakes, and it is usually the dominant plant where it occurs (eg. Lake Way, Lake Miranda). It always grows immediately around salt lakes or in broad, shallow drainage lines in fairly flat country. The soil is usually powdery red-brown or brown loams over white calcareous loams. It almost always occurs in pure stands often with *Selenothamnus* or a sparse chenopod understorey, although in the north-west of its range it is sometimes associated with *E. victrix* and near Lake Minigwal with *E. salicola*. (Figure 1)

Flowering period. Poorly known.

Conservation status. Although occurring over a large range, populations are widely scattered and this subspecies is not common (although usually locally dominant). It is not known to occur in any conservation reserves and many populations have suffered disturbance as mentioned above.

Notes. *E. striatocalyx* subsp. *striatocalyx* is more common and widespread than subsp. *delicata*. It is more robust in form and has larger adult leaves, buds and fruits than subsp. *delicata*.

2b. *Eucalyptus striatocalyx* subsp. *delicata* Nicolle & P.J. Lang, subsp. nov.

A subspecies typica habitu fruticoso, foliis angustioribus, alabastris et fructibus minoribus, ramulis et foliis adultis pedulis differt.



Figure 4. *Eucalyptus striatocalyx* subsp. *striatocalyx* habit and bark of specimens at Millys Soak, Western Australia (note the single-stemmed uncut tree with multi-stemmed trees that have been cut for timber on either side), and fruits (life size, from D. Nicolle 1548).

Distinguished from subsp. *striaticalyx* by its poorer, depauperate tree habit; its less extensive rough bark; its narrow-lanceolate adult leaves, 70-160 mm long by 7-14 mm wide; its smaller buds and fruits (buds 6-11 mm long by 3-4 mm diam.; fruits 5-9 mm long by 5-7 mm diam.); and the notably pendulous branchlets.

Typus: Lake Annean, South of Meekatharra, Western Australia, 26° 53' 59"S, 118° 16' 25"E, 18 September 1995, D. Nicolle 1547 (*holo*: PERTH; *iso*: CANB).

Selected specimens examined. WESTERN AUSTRALIA: Lake Austin, 12 Aug. 1965, I. Brooker 1996, 1997, 1998 (PERTH); 72.5 km by road NNE of Cue towards Meekatharra, Lake Annean - kopi dune east of road, 8 Dec. 1978, P.J. Lang 1478, 1479 (AD); Lake Annean, S of Meekatharra, 26° 53' 59"S, 118° 16' 25"E, 18 Sep. 1995, D. Nicolle 1546 (AD, CANB).

Distribution and habitat. Restricted to immediately around Lake Annean and Lake Austin in the northern goldfields of Western Australia. It occurs in open, pure stands on gypseous low dunes (lunettes) beside salt lake systems. These dunes support very little vegetation, mostly *Selenothamnus*, apart from this taxon. The dunes consist of very calcareous fine white to brown powdery silt-loams. The habitat is similar to that occupied by *E. striaticalyx* subsp. *striaticalyx*, but is somewhat harsher, indicated by the very sparse vegetation covering the ground and the depauperate nature of the trees. (Figure 1)

Flowering period. Not known.

Conservation status. Of restricted distribution and not known to occur in a conservation reserve. It is locally dominant where it occurs although seedling regeneration is not apparent. Listed as Priority 1 by the Department of Conservation and Land Management.

Etymology. From the Latin *delicata* - meaning delicate or soft, referring to its pendulous crown of narrow leaves and small buds and fruits compared to the type subspecies.

Notes. This is a distinctive subspecies of *E. striaticalyx*, notable because of its depauperate form, narrow leaves and noticeably pendulous branchlets compared to subsp. *striaticalyx*. It occupies a similar but harsher habitat to subsp. *striaticalyx*, being the only plant of significant size where it grows with a very sparse understorey of few species. *E. striaticalyx* subsp. *delicata* occurs within the general distribution of *E. striaticalyx* subsp. *striaticalyx*, however, the two subspecies are not known to grow in mixed stands. Although this subspecies is of restricted distribution, it is well represented in herbaria although many specimens are poor and consist mainly of stem and leaf material, with most collections coming from around Lake Annean.

3. *Eucalyptus gypsophila* Nicolle, *sp. nov.*

Affinis *E. striaticalyxi* sed characteribus sequentibus distinguitur: habitu pluricauli ("mallee"), cortice fibroso in dimidio inferiore, ramulis variabile glaucis, alabastris fructibusque et operculis hemispherical vel acutis differt.

Distinguished within the *E. striaticalyx* group by the combination of mallee habit, persistent rough bark on lower half of stems, variably pruinose twigs, buds and fruits, blue-green to grey-green lanceolate leaves, slightly ribbed, medium-sized buds with a conical to hemispherical operculum and medium-sized smooth to striated fruits.

Typus: Northern part of Yumberra Conservation Park, South Australia, 31°39'28"S, 133°46'43"E, 22 July 1995, *D. Nicolle* 1405 (*holo*: PERTH; *iso*: AD).

Mallee, 3-6 m tall; lignotubers present. Rough *bark* persistent, sub-fibrous and flaky, grey-brown to dark grey over tan for 1-3 m (lower half of stems), then smooth, tan to grey over cream to grey. *Branchlets* sometimes pruinose, pith glands present. *Cotyledons* reniform; seedling leaves opposite for 1-3 pairs then alternate, petiolate, ovate, blue-grey, usually pruinose. *Adult leaves* alternate, petiolate, broad-lanceolate to lanceolate, 90-130 mm long, 18-25 mm wide, concolorous, dull, blue-green to blue-grey, occasionally slightly pruinose; reticulation dense, with numerous intersectional oil glands, lateral veins at 40°-60° from midrib. *Inflorescences* axillary, unbranched, 7-11-flowered, peduncles thick, terete, 4-18 mm long; pedicels 2-4 mm long. *Buds* sometimes pruinose, 7-12 mm long, 5-7 mm diam.; hypanthium cupular, tapering to pedicel, smooth; operculum hemispherical to conical, apiculate to rounded, equal in width or very slightly wider than hypanthium, almost smooth to lightly ribbed. *Stamens* strongly inflexed, all fertile; anthers versatile, oblong, opening by longitudinal slits. *Flowers* creamy white. *Ovules* in 4 vertical rows. *Fruits* sometimes pruinose, cupular to shortly cylindrical, 6-10 mm long, 6-11 mm diam., smooth to slightly ribbed; operculum scar sometimes conspicuous, ascending to level, 1-2 mm wide; disc level to descending, 2-3 mm wide; valves (3)4, around rim level. *Seeds* compressed ovoid to compressed spherical, 1.2-2.5 mm long, glossy, dark tan-brown to red-brown, reticulum shallow to medium; chaff glossy, tan to red-brown. (Figure 5)

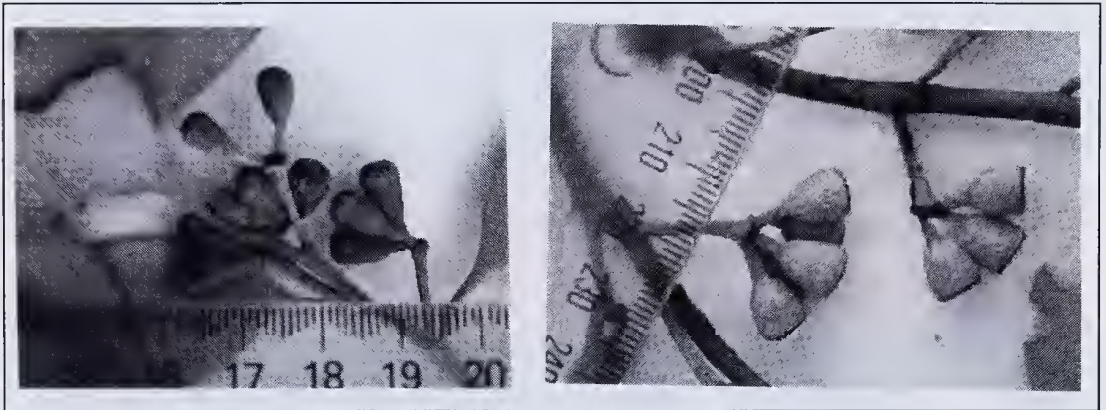


Figure 5. *Eucalyptus gypsophila* buds and fruits (life size, from *D. Nicolle* 1405).

Selected specimens examined (west to east). WESTERN AUSTRALIA: 62 km S of Neale Junction, Great Victoria Desert, 28°45'S, 125°48'E, 12 May 1984, *I. Brooker* 8563 (AD, PERTH); c. 1 km E of Talling Peak, 50 km NNE of Mullewa, 17 Aug. 1983, *S.D. Hopper* 3136 (PERTH); Savory Creek, Kertland District, 23°41'S, 121°36'E, 12 June 1984, *G.J. Morse* 127 (CANB, PERTH); 179 km W of intersection of Cook to Vokes Hill road and Oak Valley to Tjuntjunjara road, 29°34'17"S, 128°23'42"E, 27 Sep. 1993, *D. Nicolle* 499 (AD, CANB); Track S of Lake Minigwal, 29°52'06"S, 123°06'18"E, 30 Sep. 1993, *D. Nicolle* 525 (AD); Ann Beadell Highway, just W of Serpentine Lakes, 28°30'35"S, 128°59'40"E, 16 Sep. 1995, *D. Nicolle* 1520 (AD, CANB); Ann Beadell Highway, just W of Serpentine Lakes, 28°30'53"S, 128°57'38"E, 16 Sep. 1995, *D. Nicolle* 1521 (AD); Ann Beadell Highway, E of Neale Junction, 28°19'58"S, 127°20'44"E, 16 Sep. 1995, *D. Nicolle* 1529 (AD, CANB); Talling Peak, 28°15'35"S, 115°39'29"E, 18 Sep. 1995, *D. Nicolle* 1550 (AD, CANB, PERTH, NSW); 26 km NNW of Queen Victoria Spring, Queen Victoria Spring Nature Reserve, 30°15'S, 123°24'E, 26 May 1990, *D.J. Pearson* 810 (PERTH).

SOUTH AUSTRALIA: 29 km N of Watson towards Maralinga, 10 Mar. 1984, *I. Brooker* 8470 (AD); Vokes Corner - north-west plains, 17 July 1972, *N.N. Donner* 3905 (AD, NBG, CANB, SI, TI, TAI, LIS); E of Serpentine Lakes, 21 July 1979, *T. Dennis* 205 (AD); 117 km N of Hughes Station 52, 12 July 1967, *J. Johnson s.n.* (AD); E side of lake with centre at 29° 48' 30"S, 132° 54' 50"E, W of Dingo Flat gate, Commonwealth Hill Station, 12 July 1981, *F. Mollemans* 809 (AD, CANB, PERTH); Tarcoola to Ceduna track, 31° 13' 14"S, 133° 59' 11"E, 22 July 1995, *D. Nicolle* 1400 (AD); Vokes Hill Junction, Ann Beadell Highway, 28° 33' 55"S, 130° 41' 12"E, 15 Sep. 1995, *D. Nicolle* 1515 (AD, CANB); Serpentine Lakes, 28° 29' 59"S, 129° 01' 54"E, 15 Sep. 1995, *D. Nicolle* 1519 (AD, CANB); 40 km NE of Maralinga, 15 Nov. 1972, *R.C. Shearer* 67 (AD); c. 155 km N of Hughes, 16 Feb. 1972, *R.C. Shearer* 137 (AD); 10 km S of Mt Christie Siding on new track, 30° 37' 54"S, 133° 14' 49"E, 17 Oct. 1987, *D.E. Symons s.n.* (AD, CANB); 3.28 km E of Western Australian Border on track from Serpentine Lakes, 30 July 1979, *L.D. Williams s.n.* (AD).

Intergrades. *E. gypsophila* - *E. striatocalyx* intergrades are cited under the latter.

E. gypsophila - *E. canescens* subsp. *canescens*: SOUTH AUSTRALIA: Cook road, c. 75 km WSW of Lake Maurice (station 39), 29 June 1967, *J. Johnson s.n.* (AD); Maralinga to Oak Valley road, 29° 27' 31"S, 130° 48' 47"E, 14 Sep. 1995, *D. Nicolle* 1503 (AD); Cook to Vokes Hill road, 28° 50' 15"S, 130° 29' 03"E, 15 Sep. 1995, *D. Nicolle* 1509 (AD, CANB); Cook to Vokes Hill road, 28° 36' 43"S, 130° 37' 32"E, 15 Sep. 1995, *D. Nicolle* 1512 (AD); W of Lake Maurice, 27 May 1970, *S. Reid & J. Johnson s.n.* (AD).

E. gypsophila - *E. dumosa* sens. lat.: SOUTH AUSTRALIA: Koongawa water reserve adjoining S side of Eyre Highway, 33° 10'S, 135° 23'E, 8 Feb. 1978, *P.J. Lang* 1227 (AD); NE of Wirrulla, 32° 22' 16"S, 134° 53' 34"E, 13 Sep. 1995, *D. Nicolle* 1489 (AD); SW of Yardea in sand dunes between Gawler Ranges, 32° 30' 37"S, 135° 21' 23"E, 15 Feb. 1996, *D. Nicolle* 1679 (AD, CANB); 49.1 km N of Minnipa towards Yardea, 32° 32'S, 135° 23'E, 28 Oct. 1978, *L.D. Pryor & J.D. Briggs* 209 (AD).

Distribution and habitat. Widespread and relatively frequent in the Great Victoria Desert of Western and South Australia, scattered from east of Laverton and Queen Victoria Spring in Western Australia to the western edge of the Gawler Ranges in South Australia. It grows on red sand over shallow powdery limestone throughout most of its range, often near or around salt or playa lakes. At the extreme south-east of its range, near the Gawler Ranges, it grows on low orange sand dunes near small salt lakes with *E. concinna*. There are also a number of disjunct occurrences to the north-west of its main distribution, possibly remnant populations from the past when it may have been more common there. The most disjunct population, apparently a remnant, occurs at Talling Peak, north-east of Geraldton in Western Australia, where about 50 mallees grow on a rocky breakaway of quartz and ironstone in low open shrubland. This habitat is typical of these disjunct north-western populations but differs from the more sandy soils in which it grows in Great Victoria Desert, however these mallees are morphologically identical to *E. gypsophila* in the Great Victoria Desert. Similar remnant populations of *E. gypsophila* occur in the Kennedy Ranges, near Marymia and at Savoury Creek. On sand dunes where the Great Victoria Desert enters into the western Gawler Ranges, *E. gypsophila* intergrades into the northern Eyre Peninsula form of *E. dumosa*. Commonly associated species in the Great Victoria Desert include *E. eucentrica*, *E. gongylocarpa*, *E. concinna*, *E. eremicola* and *E. youngiana* with a *Triodia* understorey. (Figures 1,2)

Flowering period. Not known.

Conservation status. *E. gypsophila* is widespread and well represented in conservation reserves such as Neale Junction Nature Reserve in Western Australia and Unnamed Conservation Park and Yumbarra Conservation Park in South Australia. The isolated Talling Peak population is small and may be under threat from proposed iron-ore mining activity in the area.

Etymology. From the Greek *gypsos* - of gypsum or white plaster, and *philos* - meaning loving, referring to its common occurrence on gypseous sand dunes around playa lakes.

Notes and affinities. By far the most widespread taxon in the *E. striatocalyx* group, with populations representing the most easterly (west of the Gawler Ranges) and westerly (Kennedy Ranges) boundaries for this group. This taxon is also the most variable taxon described here, perhaps a reflection of its large distribution. Its most variable feature appears to be pruinosity, sometimes present on the twigs, buds and fruits. The pruinosity of branchlets in *E. gypsophila* follows somewhat of a geographical pattern, with the remnant western populations consistently being distinctly pruinose, however in the Great Victoria Desert this pattern breaks down with pruinose and non-pruinose populations occurring apparently at random, although usually less pruinose than western populations except where adjoining the distribution of *E. canescens* subsp. *canescens*.

4. *Eucalyptus repullulans* Nicolle, *sp. nov.*

Affinis *E. striatocalyci* sed characteribus sequentibus distinguitur: habitatione saxosa, habitu pluricauli ("mallee"), cortice deciduo et ramulis glaucis, alabastris fructibusque glaucis differt.

Distinguished within the *E. striatocalyx* group by the combination of its harsh, rocky habitat, mallee habit, smooth bark, pruinose twigs, buds and fruits, lanceolate leaves, medium-sized, lightly ribbed buds and fruits and conical to beaked operculum.

Typus: Near summit of Mt Nameless, near Mt Tom Price, Hamersley Ranges, Western Australia, 22° 43' 16"S, 117° 45' 41"E, 29 November 1994, *D. Nicolle* 1192 (*holo:* PERTH; *iso:* AD, CANB).

Illustrations. Habit, bark, buds and fruits in Brooker & Kleinig (1994: 225) as *E. striatocalyx*; buds and fruits in Chippendale (1968:48) as *E. striatocalyx*.

Slender-stemmed *mallee* 3-5 m tall, forming lignotubers. *Bark* smooth throughout (a little persistent rough bark may be present at extreme base), light grey, pink and pinkish-tan over cream. *Branchlets* sometimes pruinose; pith glands present. *Cotyledons* reniform; seedling leaves opposite for 3-6 pairs, petiolate, ovate, 20-45 x 9-22 mm, discolorous, dull to slightly glossy, green, petioles and juvenile new growth pruinose. *Adult leaves* alternate, petiolate, narrow-lanceolate to lanceolate (to broad-lanceolate), 70-125 mm long, 12-30 mm wide, concolorous, dull, blue-green, sometimes slightly pruinose; reticulation dense, with numerous intersectional oil glands, lateral veins at 40°-60° from midrib. *Inflorescences* axillary, unbranched, 7-9-flowered; peduncle terete to angular, 12-14 mm long; pedicels 2-4 mm long. *Buds* 7-11 mm long, 5-6 mm diam., pruinose; hypanthium smooth or weakly ribbed; operculum equal to or wider than hypanthium, ribbed, conical, rounded or apiculate. *Stamens* strongly inflexed, all fertile; anthers versatile, oblong, opening by longitudinal slits. *Flowers* creamy white. *Ovules* in 4 vertical rows. *Fruits* pedicellate, cupular to slightly campanulate, smooth to weakly ribbed, usually pruinose, 6-9 mm long, 6-9 mm diam.; operculum scar 1 mm wide, ascending or level; disc descending; valves 3 or 4, slightly below rim level to slightly exserted. *Seeds* compressed-ovoid to compressed-spherical, 1.2-2 mm long, glossy, orange-brown to red-brown, reticulum fine to medium; chaff glossy, tan to brown. (Figure 6)

Etymology. From the Latin *repullulans* - sprouting again, referring to the mallee habit, in contrast to *E. striatocalyx*.

Selected specimens examined (west to east). WESTERN AUSTRALIA: Mount Tom Price township at Mrs L. Mattiske residence, 22°45'S, 117°46'E, 10 Aug. 1980, *C.D. Boomsma* 669, 670 (AD); 28 km W of rail crossing, N of Newman on Packsaddleroad, 23°14'S, 119°33'E, 6 July 1983, *I. Brooker* 8207 (CANB, PERTH); Haulpak Track, N of Mt Meharry, 22°50'S, 118°35'E, 7 July 1983, *I. Brooker* 8217 (CANB, PERTH); 18.3 km from Tom Price towards Paraburdoo, 22°50'S, 117°47'E, 9 July 1983, *I. Brooker* 8240 (CANB, PERTH); SW of Tom Price, Hamersley Ranges, 22°37'50"S, 117°36'56"E, 29 Nov. 1994, *D. Nicolle* 1188 (AD, CANB); 2.2 km NE of Dinner Hill, Karijini National Park, Hamersley Ranges, 22°36'15"S, 118°18'53"E, 23 May 1991, *S. Van Leeuwen* 765 (CANB, PERTH).

Distribution and habitat. Known only from the Hamersley Ranges in the Pilbara area, where it occurs as scattered populations in shallow skeletal soils on the slopes and summits of prominent mountains (eg. Mt Nameless, Mt Bruce, Mt Meharry and Mt Robinson) and the surrounding undulating areas, in open mallee shrubland. Recorded associated taxa are *Eucalyptus socialis*, *E. gamophylla*, *E. kingsmillii* subsp. *kingsmillii*, *E. pilbarensis*, *E. trivalvis*, *E. leucophloia*, *E. aff. lucasii*, *Corymbia hamersleyana*, *C. ferritcola* subsp. *ferritcola*, and *Acacia* spp. with a *Triodia* ground cover. (Figure 1)

Flowering period. Not known.

Conservation status. The scattered populations are at little risk from any activity in the area and the taxon has been recorded in Karijini National Park. This subspecies recovers vigorously following fire.

Notes. *E. repullulans* is geographically isolated from all other taxa in extra-codical section *Dumaria* (Pryor & Johnson 1971) and occurs in a habitat unlike that of other taxa in the *E. striaticalyx* group. Herbarium specimens appear very similar to *E. gypsophila*, however the habitat, habit and bark characteristics readily distinguish the two species. This taxon is poorly represented in herbaria and habit and bark have rarely been accurately recorded on herbarium specimens.

A specimen (*D. Symon* 8403), collected in the Wingelina nickel area of the Blackstone Range in Western Australia may be this taxon but, as bark characteristics are not noted, it is indistinguishable from *E. gypsophila*. The "lower slopes of low hills" habitat for this specimen matches that of *E. repullulans* and it is said to be a "graceful mallee, ends of branches sometimes drooping". Further field investigation will resolve its determination.

5. *Eucalyptus canescens* Nicolle, *sp. nov.*

Affinis *E. striaticalyxi* sed characteribus sequentibus distinguitur: habitatione arenacea, habitu fruticoso ("mallee"), alabastris majoribus; fructibus costatis et majoribus; foliis adultis latioribus; ramulis, alabastris et fructibus non-pruinosis vel pruinosis et operculis haemisphericis differt.

Distinguished within the *E. striaticalyx* group by the combination of its occurrence on red sand, effuse mallee habit, persistent rough bark, broad-lanceolate to ovate adult leaves, large, ribbed buds with a hemispherical operculum and large fruits with 4 or 5 valves.

Typus: Just south of Oak Valley, north of Cook, South Australia, 29°24'55"S, 130°43'52"E, 14 September 1995, *D. Nicolle* 1504 (*holo:* PERTH; *iso:* AD, CANB).



Figure 6. *Eucalyptus repullulans* habit of mallee from south-west of Tom Price, Hamersley Ranges, Western Australia, with buds and fruits (life size, from D. Nicolle 1192).

Mallee 2-6 m tall, forming lignotubers. Rough *bark* persistent, thick and flaky, brown to grey over red-brown to yellow-brown over stems to about 5 cm diameter. *Branchlets* not pruinose in subsp. *beadellii* or strongly pruinose in subsp. *canescens*; pith glands present. *Cotyledons* reniform; seedling leaves opposite for 1-3 pairs then alternate, petiolate, ovate, to 35 x 23 mm. *Adult leaves* alternate, petiolate, elliptic or ovate to broad-lanceolate (to lanceolate), 45-115 mm long, 22-55 mm wide, concolorous, dull, blue-grey to grey and usually pruinose in subsp. *canescens*, or dull to slightly glossy, green in subsp. *beadellii*; reticulation dense, with numerous intersectional oil glands, lateral veins at 35°-55° from midrib. *Inflorescences* axillary, unbranched, 7-flowered; peduncle thick, terete to slightly flattened, 8-18 mm long; pedicels thick, tapering to fruit, 2-8 mm long. *Buds* strongly pruinose in subsp. *canescens*, not pruinose in subsp. *beadellii*, pyriform to ovoid to somewhat mushroom-shaped, 11-16 mm long, 8-11 mm diam.; hypanthium tapering to pedicel, obconical to cupular, smooth to ribbed; operculum hemispherical, apiculate to rounded, equal in width or wider than hypanthium, ribbed. *Stamens* strongly inflexed, all fertile; anthers versatile, oblong, opening by longitudinal slits. *Flowers* creamy white. *Ovules* in 4 vertical rows. *Fruits* pruinose, especially when young in subsp. *canescens*, not pruinose in subsp. *beadellii*, broadly obconical to cupular to shortly cylindrical, 10-16 mm long, 9-14 mm diam., smooth to strongly ribbed; operculum scar conspicuous, ascending to level, 1-3 mm wide; disc level to descending, 1-4 mm wide; valves 4 or 5, at or just below rim level. *Seeds* strongly compressed-ovoid, 2-4 mm long, glossy, red-brown, reticulum fine to medium; chaff glossy, orange-brown.

Etymology. From the Latin *canescens* - grey or becoming grey, referring to the grey general appearance of the type subspecies, caused by the greyish adult leaves and pruinose branchlets, buds and fruit.

Notes and affinities. To the north and east of its distribution, *E. canescens* is replaced by *E. gypsophila* and the two species intergrade in the area around Wyola Lake to Lake Maurice. This species is low-growing and has the broadest leaves and largest buds and fruits of those treated here. Both subspecies therefore have horticultural appeal.

There are two subspecies:

1. Twigs, buds and fruits strongly pruinose, adult leaves greyish 5a. subsp. *canescens*
1. Twigs, buds and fruits not pruinose, adult leaves green 5b. subsp. *beadellii*

5a. *Eucalyptus canescens* Nicolle subsp. *canescens*

Distinguished from subsp. *beadellii* in its strongly pruinose twigs, buds and fruits, the blue-grey, often pruinose adult leaves and the more cupular, ribbed fruits. (Figure 7)

Selected specimens examined. SOUTH AUSTRALIA: 232 km N of Cook, 28 Aug. 1986, *J. Brooker* 9427 (AD); 131 km N of Cook on road to Vokes Hill, 20 Aug. 1979, *T.E. Dennis* 188 (AD); 131 km N of Cook on road to Vokes Hill, 20 Aug. 1979, *T.E. Dennis* 189 (AD); 191 km N of Cook on road to Vokes Hill, 20 Aug. 1979, *T.E. Dennis* 191 (AD); 29° 31' S, 130° 08' E, 16 Aug. 1980, *T.E. Dennis* 213 (AD); Cook road, about 75 km WSW of Lake Maurice, 29 June 1967, *J. Johnson* (AD); Cook-Vokes Hill road, Great Victoria Desert, 29° 30' 42" S, 130° 18' 56" E, 5 Dec. 1992, *D. Nicolle* 108 (AD, CANB, PERTH); Cook to Vokes Hill road, Great Victoria Desert, 29° 33' 49" S, 130° 08' 22" E, 26 Sep. 1993, *D. Nicolle* 487 (AD, CANB); Maralinga-Oak Valley road, 29° 52' 00" S, 131° 15' 38" E, 14 Sep. 1995, *D. Nicolle* 1499 (AD, CANB); Maralinga-Oak Valley road, 29° 48' 40" S, 131° 10' 00" E, 14 Sep. 1995, *D. Nicolle* 1501 (AD, CANB); about 135 km N of Cook on Cook-Vokes Hill road, 29° 35' S, 130° 07' E, 18 Aug. 1980, *D.E. Symon* 12236 (AD, FRI); Cook-Vokes Hill road, N of Nullarbor Plain, 29° 32' S, 130° 09' E, 20 Aug. 1980, *D.E. Symon* 12255 (AD, FRI, NSW); About 130 km N of Cook along Cook-Vokes Hill road, 29° 36' S, 130° 08' E, 19 Aug. 1980,

J.Z. Weber 6316 (AD); 121 km W of N of Cook, 29°32.5'S, 130°75'E, 18 July 1979, *L.D. Williams* 10492 (AD).

Intergrades. *E. canescens* subsp. *canescens* - *E. gypsophila* intergrades are cited under the latter.

Distribution and habitat. Known from the Ooldea Range, part of the Barton Dune system in the southern part of the Great Victoria Desert, immediately north of the Nullarbor Plain, from north-west of Cook to near Maralinga. It is common on the track north of Cook. Endemic to South Australia. It occurs on sand dunes or sand plains in red sand, sometimes with limestone rubble present. Associated taxa include *E. pimpiniana*, *E. concinna*, *E. eremicola*, *E. eucentrica* and *E. eucentrica*-*E. wyolensis* intergrades. (Figure 2)

Flowering period. Not known.

Conservation status. Endemic to the Maralinga Aboriginal Lands where it is scattered but locally common and not considered to be at risk. *E. canescens* subsp. *canescens* - *E. gypsophila* intergrades have been recorded in Unnamed Conservation Park as has *E. gypsophila*, but *E. canescens* (subsp. *canescens* and subsp. *beadellii* have not).



Figure 7. *Eucalyptus canescens* subsp. *canescens* lower bark on mallee north of Cook, South Australia (*D. Nicolle* 487), buds and fruits (*D. Nicolle* 1504).

Notes and affinities. Herbarium specimens of *E. canescens* subsp. *canescens* are somewhat similar to *E. cretata* Lang & Brooker of central Eyre Peninsula, from which it differs in its smaller stature, persistent, rough bark (smooth in *E. cretata*), consistently dull, ovate to broad-lanceolate adult leaves (maturing glossy and lanceolate in *E. cretata*), larger buds and fruit (fruit 6–8 mm long and 6–8 mm diam. in *E. cretata*) and consistently hemispherical operculum (rounded to beaked in *E. cretata*). *E. canescens* subsp. *canescens* is particularly ornamental and would merit cultivation in arid areas. Hybrids are known with *E. concinna* Maiden & Blakely and *E. eucentrica* Johnson & Hill. A specimen of the intersectional hybrid *E. eucentrica* × *E. canescens* subsp. *canescens* constitutes the type material of *E. yumbarrana* Boomsma subsp. *striata* Boomsma.

5b. *Eucalyptus canescens* subsp. *beadellii* Nicolle, subsp. nov.

A subspecie typica characteribus sequentibus distinguitur: foliis adultis latioribus et viridibus; ramulis, alabastris fructibusque non-pruinosis differt.

Distinguished from subsp. *canescens* in the non-pruinose twigs, buds and fruits, the dull to slightly glossy, green adult leaves and the more obconical, almost smooth fruits. (Figure 8)

Typus: Junction of Cook to Vokes Hill road and Oak Valley to Tjuntjunjara road, Great Victoria Desert, South Australia, 29° 20' 00" S, 130° 11' 50" E, 26 September 1993, *D. Nicolle* 489 (*holo:* PERTH; *iso:* CANB).

Selected specimens examined. SOUTH AUSTRALIA: Just E of Cook to Vokes Hill road on Oak Valley road, Great Victoria Desert, 29° 15' S, 129° 55' E, 20 Aug. 1980, *T. Dennis* 220 (AD, FRI); 29° 20' 07" S, 130° 13' 15" E, 14 Sep. 1995, *D. Nicolle* 1506 (AD, CANB).

Distribution and habitat. Of very restricted occurrence, known only in the vicinity of the junction of the Cook to Vokes Hill track and the Oak Valley track, north of Cook. Here it is part of a mallee community in deep red sand in level country. Associated species include *E. wyolensis*, *E. concinna*, *E. eucentrica*, *E. pimpiniana* and *E. yumbarrana* with an understorey mainly of *Triodia*. (Figure 2)

Flowering period. Not known.

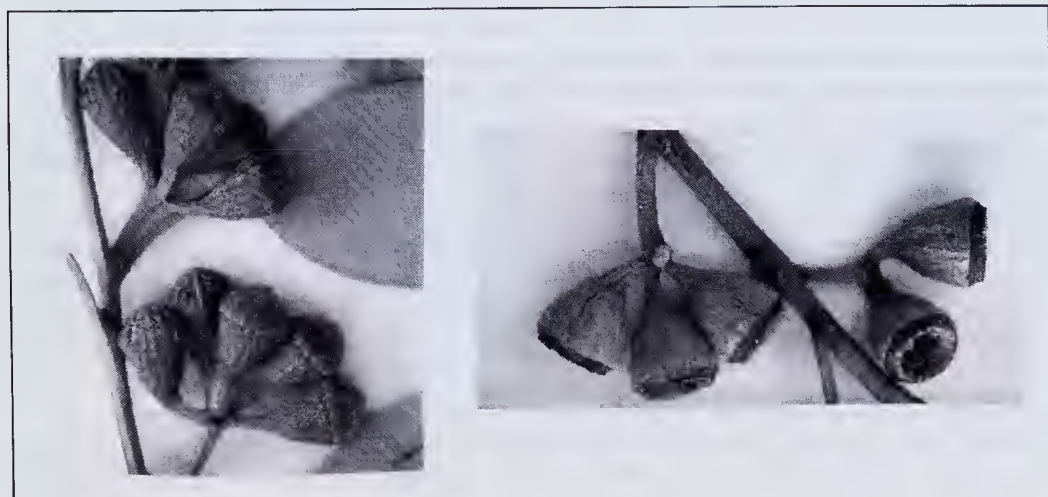


Figure 8. *Eucalyptus canescens* subsp. *beadellii*, buds and fruits (life size, from *D. Nicolle* 489 the *Type*).

Conservation status. By far the rarest taxon in the *E. striatocalyx* group, with a known distribution of only a few square kilometres. It is likely that it occurs elsewhere in such a large, remote area of similar habitat. The entire known populations occur within Maralinga Aboriginal land. The mallees recover well from fire through coppice shoots from the lignotuber and the taxon is currently under no threat. The status code 2R is suggested using criteria of Briggs & Leigh (1989).

Etymology. The epithet commemorates Len Beadell (1923-1995), who surveyed over 5000 km of roads to open up the Great Victoria, Gibson and Great Sandy Deserts to present day travellers and botanists. These roads are still the only access to much of these areas today.

Notes and affinities. No other taxa from series *Rufispermae* occur within the distribution of *E. canescens* subsp. *beadellii*, however, subsp. *canescens* occurs to the east and south and *E. gypsophila* mainly to the north. The large club-shaped buds are conspicuous when mature. The distribution and habitat roughly matches that of the rare *E. wyolensis* Boomsma, although *E. wyolensis*-*E. eucentrica* intergrades occur westwards almost to the Western Australian border. *E. canescens* subsp. *beadellii* has the same gross morphology as subsp. *canescens* but differs in the dull to slightly glossy, green adult leaves and the non-pruinose twigs, buds and fruits.

Acknowledgements

Thanks must go to Ian Brooker for checking the manuscript and much helpful advice and discussions. Peter Lang gave much helpful advice and is co-author of *E. striatocalyx* subsp. *delicata*. I would also like to thank Martin Oleary and John Jessop for continuing support and access to the State Herbarium. Thanks also to Malcolm French for bringing the Tallering Peak population of *E. gypsophila* to my attention. The Maralinga Tjarutja provided support by allowing access within their lands.

References

- Briggs, J.D. & Leigh, J.H. (1989). "Rare or Threatened Australian Plants 1988 Revised Edition." Special Publication No.14. (Australian National Parks and Wildlife Service: Canberra.)
- Brooker, M.I.H. & Kleinig, D.A. (1990). "Field Guide to Eucalypts." Vol. 2. (Inkata Press: Melbourne.)
- Brooker, M.I.H. & Kleinig, D.A. (1994). "Field Guide to Eucalypts." Vol. 3. (Inkata Press: Melbourne.)
- Chippendale, G.M. (1968). "Eucalyptus Buds and Fruits." (Commonwealth of Australia, Forestry and Timber Bureau.)
- Fitzgerald, W.V. (1904). Additions to the west Australian flora. J. W. Austral. Nat. Hist. Soc. 1: 3-43.
- Lang, P.J. (1983). "Morphological variation in *Eucalyptus* L'Herit., series: *Dumosae*." Ph.D. Thesis. Dept of Botany, University of Adelaide.
- Maiden, J.H. (1912). "A Critical Revision of the Genus *Eucalyptus*." Part 2. (Government Printer: Sydney.)
- Pryor, L.D. & Johnson, L.A.S. (1971). "A Classification of the Eucalypts." (Australian Univ. Press: Melbourne.)